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CONSTRAINTS AND ADOPTION STRATEGIES FOR IMPLEMENTING DRIP IRRIGATION PROJECT IN RURAL INDIA

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ABSTRACT

Water is the lifeline of Agriculture, over 70% of population is dependent on agriculture in India. The agriculture sector is a major water consuming sector which consumes over 80 % of the available water in India. The paper concentrates on the he steps that was followed for effective implementation of drip systems in the field and the strategies followed to mobilize the farmers and difficulties faced in shifting them from furrow irrigation to drip irrigation. The challenges arises during the implementation of the project and methods to overcome the situation is discussed. This paper shares the real time experiences gathered at three districts viz., Coimbatore, Kancheepuram and Thiruvallur districts, Tamil Nadu, India in the period October 2012 – November 2016 during implementation of drip system for the mid-level educated farmers and bottom up approach for the success implementation of the project in the field level. Step by step process that can be adopted in the Research and Development project that can adopted for the success implementation of the project.

INTRODUCTION

Water is becoming scarce and it limits the agricultural production in developing countries across the world. By effective usage of irrigation technologies, the 50% of the

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demand for water by the year 2025 can be met out (Seckler et al., 1998). Water scarcity is a major problem and there are many steps taken by the government and non-government organizations to make minimum utilization of water with maximum output efficiency. Drip irrigation helps in proper utilization of fertilizer, increase the yield and reduction of tillage during cultivation of crops (Qureshi et al., 2001). Usage of drip irrigation creates social impacts like average land holding 17.60 ha, average gross cropped area in a year 13.18 ha, incidence of migration 0.60 % than the non-adopters of drip irrigation with 10.56 ha, 11.06 ha and 1.32%. (Shah et al., 2005).

Many technologies are implanted in order to conserve water, one of the technology is drip irrigation. Though drip system has been introduced many years before, still it has not reached the rural India and small land holding farmers. The education level of farmers plays a vital role in adopting drip irrigation, the educated farmers are more aware and they are ready to learn the new technologies which are useful for their cultivating practices in agriculture (Cason & Uhlaner 1991). The farmers who have enrolled in farmer's association are able to adopt the water conservation technique very easily. Since the association helps them in capacity building and awareness creation among farmers (Sidibe, A. 2005).

The plots which are rain fed, yield half of the quantity of the irrigated plots in the developing countries. It shows that the irrigated area has to increase in order to get double the yield of rain fed plot. (Postel, 1999) Postel, S. (1999). Pillar of sand: can the irrigation miracle last?. WW Norton & Company. The important factor for shifting for new irrigation technologies depend on the political changes and policies that takes places in the country. When the government gives more importance on irrigation, surely it will have a impact on adoption of irrigation technologies by the farmers. (Avella & Garcia Molla 2008).

RELATED WORKS

Farmers who have credit availability and business are alone able to invest in new technologies. The farmers who have secondary income other than non-farm were also able to adopt latest technology (Kebede, Y 1992).

The price changes in fertilizers, pesticides, market price for the produce affects the adoption of new agricultural technology by farmers. Since the income of the farmer reduces hence the farmers not interested to adopt new technology (Jarvis, 1981).

Adoption of new technology was easy and convenient for the big farmers who possess larges area of land (Feder et al., 1985). Access to information, networking with the stakeholders helps farmers to evaluate and integrate the information available to take healthier decision. (Ghadim & Pannell, l999).

The Constraints experienced by the farmers in drip irrigation was no follow up services by drip agencies, high initial investments, lack of capital to cover maximum holding under drip irrigation, delay in sanction by the loan by the banker and subsidy by the government departments. Advantages of drip irrigation is saving in water, saving in labour and uniform application of water and higher benefit cost ratio when compared to surface irrigation (Shashidhara et al., 2004)

The successful adoption of micro irrigation technologies requires the fulfillment of three basic factors: (a) the technologies need to be economically and technically viable; (b) awareness among farmers about the technology; and (c) the technology should be accessible by the farmers (Namara et al., 2001)

The advantages of drip irrigation is water savings, quality in plant growth and increase in yield and reduction in labour cost, the system needs only less amount of labour to operate the system. (Alam, et al., 2006).

STUDY AREA

The project was implemented by Centre for Water Resources, Anna University, Chennai which was funded by the National Agriculture Development Programme through Department of Horticulture in three districts namely Coimbatore, Kancheepuram and Thiruvallur districts of Tamil Nadu, India for a period of four year from October 2012 to November 2016. In this paper it is concentrated on the experience gained from above said three districts. Coimbatore is a metropolitan city and we have big farmers, who are good in cultivating horticulture crops. The farmers are also aware of drip irrigation but reluctant to give farmers contribution and the Tamil Nadu Agriculture University (TNAU) is also close by, which is an added advantage to the farmers. Kancheepuram district is a adjacent district to the capital city, Chennai. The farmers mostly cultivate paddy and groundnut or leave the land as empty without cultivating. The farmers are also small and medium farmers and not aware of latest technologies in agriculture / horticulture. Thiruvallur district is also very close Chennai. The farmers are very rigid to accept drip irrigation and they are interested to depend on nearby capital city for their livelihood more than the agriculture. Due to urbanization most of the farming lands are converted to buildings.

METHODOLOGY

The methodology followed is observation method and the experience gained by the implementing agency i.e., Centre for Water Resources, Anna University during the past four years while implementing the project in the field with the representatives from staff members of the project, drip companies, government officials and farmers. The observation method was also used during field visit. The experience gained by the staff members were shared that helped to convert this paper as a implementing protocol. This paper discusses the challenges and adoption strategies during implementation of a drip irrigation project in the field.

PROBLEMS FACED IN DRIP SANCTION AND INSTALLATION

- Farmers were only interested to install drip system within the allotted 100% subsidy. The farmers were of the opinion that they need not pay anything from their pocket, as everything will be borne by the subsidy cost. When farmers came to know about their contribution, then many farmers started to hesitate to join the scheme. Then enormous effort was put to convince the farmers as to why they should bear the extra cost and explaining at length the benefits of the drip irrigation system, there were acceptance by most of the farmers barring which we could not convince.
- When the necessary documents were collected from the farmers, the documents were not up to date. For the collected documents, it was kept the validity within six months. The farmers found it difficult to get the small farmers certificate once again,

as the small farmers certificate will not be issued as quick as other certificates. The name that appears in the Patta, Adangal, FMB sketch, Small Farmers Certificate were not the same. When the farmers were asked to change the name in the documents, they were not comfortable to do so. Many documents which were not correct were returned and once again the correct documents were collected from the farmers. This ultimately led to delay in installation of drip system & release of subsidy.

- In some places, the land was surveyed and quotation were prepared and given to the farmers. After carrying out all the work, farmers shared that they were not interested in drip system. Some farmers wanted to merely check the area of their field, hence they asked the drip company to measure their land. They would like to confirm that the area in the field and the patta are same. This behavior of the farmers made the drip company to charge amount for surveying their lands.
- Quotations amount will differ from one farmer to another farmer depending on the area, size, shape and location of their land. The mentality of the farmers that the implementing agency is cheating them, since there is difference in quotation for one farmers to another. Farmers asked lot of queries why there was the difference and another farmer get lesser contribution. It should be explained to the farmers that contribution amount varies according to the field layout and bits & pieces of land here & there in the field. Afterwards the farmers got convinced and understood the pricing methods.
- The farmers were skeptical about drip systems and thought that the traditional way of irrigation is best suited for them. The farmers were also having the mentality that if they irrigate with more water, then they get high yield. Breaking the attitude of farmer was a big challenge.
- In Coimbatore district, farmers were more aware about the drip irrigation and when we explained about the project they were interested to enroll in the project. Some of the farmers belonging to Coimbatore had availed 75 percent drip subsidy even though they are eligible for 100 percent subsidy because they don't want to waste their time in getting small farmers certificate.
- In Kancheepuram district, at first they did not accept the drip irrigation. As the mind set was only for flood irrigation, drip irrigation was considered as inferior. Moreover, they were not interested to give their contribution amount. After continuous persuasion and effort by the staff members and many rounds of village visits, meetings and explanation they realized the importance of drip irrigation and started to enroll in the project.
- More than 60 villages have been visited to convince the farmers to enroll in the drip irrigation in Thiruvallur district. After continuous effort for one year, only 3 farmers were enrolled. Farmers in Thiruvallur district were not interested in drip irrigation, they were also not willing to give financial contribution for drip irrigation. The farmers were in the mindset that the entire amount for drip system will be of free of cost and they need not pay any amount from their hand as contribution for drip systems. Many rounds of meeting and discussion were conducted but in vain.

STEPS FOLLOWED IN IMPLEMENTING DRIP IRRIGATION

6.1 Awareness Creation

A series of awareness and sensitization meeting was arranged at village level. It helped the farmers and other stake holders in the villages to understand the project. The main problem in most of the project is that they directly execute the project without explaining the need and importance to the farmers. Progressive farmers and local resource persons who are interested in the project was identified. Since they will be the contact person for us in the next round of discussion and meetings that are to be arranged in the village. Stakeholders meeting was arranged at block level to converge all the line departments and officials to understand the project. No false promises and commitment should not be made to the farmers. If we make false projection which will have a bad effect on the implementing agency in the long run. Continuous series of sensitization meetings were arranged, which may make the farmers to enroll in the project

6.2 Pamphlets / Posters Display

In order to publicize the project and create impact to the farmers on the need and importance of the drip irrigation, pamphlets and posters should be designed. These pamphlets and posters shall explain about the project and contact numbers of the staff shall be indicated for getting additional information. Posters helped to get response from the farmers and they were interested to know more about the project and clarified the doubts. It will pave a way for a lot of queries among farmers and come to a conclusion about adopting drip irrigation.

6.3 Training to Project Staff

Staff members recruited for the project should be closer to the village and to farmers in order to have easy access to the project site very easily. Training had given to impart knowledge on the project and exposure visit had given. They should be exposed to the drip installed fields and explained about the mechanism involved. Project staff members was exposed to success functioning of other projects and fields where this kind of projected was successfully executed. Capacity building is a continuous process, hence a series of trainings were imparted to the projects staff members, since they are the actual implementers of project in the field. The staff members should also be encouraged to participate in workshops, seminars and conferences etc.,

6.4 Selection of Beneficiaries

Farmers who were previously not using drip irrigation method but using only conventional methods and who are willing to come under this project terms and conditions was selected first; the secondary level of selection was based on the willingness of the farmers to cooperate for a full period of the project, abiding by our rules and regulations and who are willing to pay their share of the amount over (i,e., farmer contribution) and above the subsidy availed by the farmer. Tertiary level of selection was based on the availability of proper documentation of the lands over which the farmer claims ownership and requires subsidy. The documents produced by the farmers was cautiously scrutinized and it should be the original proof of their land. The validity period of the documents should be within the

period of six months. The documents collected were Computer patta, Adangal, FMB map and Small farmer certificate.

6.5 Soil and Water Sample Analysis

After selection of the farmer, soil and water quality testing was analyzed in the laboratories. By testing the water sample one can decide whether the water is suitable for drip irrigation or not and by testing the soil, whether the soil needs amendments or not and then proceed further. Macro level soil analysis also gives the nutrient present in the soil and based on the analysis, recommendation relating to fertilizer application to the farmers were decided. Soil analysis helped the farmers to know about the deficiency and excess nutrients present in the soil. This will give a clear idea of nutrient application level for the next crop.

6.6 Checking the Non Duplication of Beneficiaries

The documents collected was checked with the nearby farmers, government officials, drip companies, community based organizations, banks, etc., It can be also discussed with the progressive farmers in the village for getting background details about the farmer. It was probed the details with the farmers itself whether they have benefited earlier from other implementing agencies or government schemes for drip irrigation. It was checked the details with the Horticulture and Agriculture Engineering department to avoid duplication of farmers in availing the subsidy for drip irrigation. Making necessary steps to ensure that the beneficiary should not get double monetary benefit at the same time.

6.7 Tamil Nadu Horticulture Development Agency (TANHODA) Norms

Since this project is funded by Tamil Nadu Horticulture Department, starting from collection of documents to end of the process, TANHODA norms were strictly followed. Farmers choose the drip companies which were approved by the TANHODA. The rates and the subsidy were all followed as per TANHODA norms. The rates and subsidy to be given to the farmers are already fixed by the Government of Tamil Nadu. The field was surveyed by the drip company, Tripartite Agreement was made between Anna University, Drip Company and farmer which had signed by all of them. The farmers contribution was collected which was enclosed along with the documents, in the form of Demand Draft in the name of the drip Company. The money should not be collected as cash from the farmer, it should be ensured that the money collected should be in the form of demand draft/electronic cash transfer. The quotation was submitted by the drip companies which was evaluated and approved by the officials of Anna University. Finally work orders were issued to the respective companies; then the materials were sent to the farmers' field and the drip system were installed. Demonstration had given to the farmers on how to operate and maintain the drip systems.

6.8 Financial Procedures Adopted in Release of Subsidy

Drip Company has to submit work completion certificate signed by the staff, farmer and the drip company staff and has to send the Invoice to Anna University. A team from the University had visited the field in the presence of drip irrigation company staff and carried out measurement (physical verification at the field and ensuring the correctness of quality

and quantity of materials). When check measurement is satisfied that the drip company have abide by all the rules and regulations, the company is entitled to receive the payment. The entire documents, invoice, work completion certificate, check measurement certificate signed by Principal Investigator / Co-Investigator and the Director/CWR shall be sent to the Internal Audit section of University for verification. After receiving the No Objection Certificate (NOC), the funds were released to the respective drip companies through Electronic Clearing Service (ECS). 2% was impounded for one year and the drip companies should support the farmers for one year.

6.9 Imparting Crop Production Practices (CPP)

Crop Production Practices were imparted to the farmers for the crops that they cultivate. The recommendations were presented to the farmers and explained about the importance of following the same in the field. By following the CPP, the farmers may able to realize the increase in yield. This will motivate the farmers to shift from the conventional irrigation methods to drip irrigation. The crop production details for each farmer should be recorded and Benefit Cost Ratio (BCR) was calculated. We presented the BCR to the farmer and explained how much the farmers were able to gain as profit, then only they realized the importance of drip irrigation. Drip irrigation helped the farmers to reduce the expenditure cost involved in cultivation.

6.10 Information on Macro Nutrient Analysis

Macro Nutrient analysis were done for the drip installed farmers. As a first process in order to understand the presence of nutrients in the soil, analysis for macronutrient and percentage of Nitrogen, Phosphorous and Potassium that was present in the soil were identified and the same was disseminated to farmers. The recommendation for the next crop had been well in advance to farmers. The macro nutrient analysis helped to increase the crop yield.

6.11 Name Board Display

The project aimed at high transparency and name board installed in the project area where drip system implemented. The name board shall be installed in the farmers' field as well as in a common place of the village. It describes the details of the project, the number of farmers enrolled in the project in the village, drip area installed, subsidy for drip system, farmers contribution, seed subsidy, macro and micro nutrient analysis etc. This created transparency among stakeholders that the amount what is being spent for the village/farmers is known to everyone. It also helps other line departments to avoid duplication of beneficiaries from other schemes.

6.12 Calculation of Benefit Cost Ratio (BCR)

BCR gives the ratio of benefit to the cost of cultivation, the data was collected from the farmer. Then calculation was made for gross income, cost of cultivation, net income and benefit cost ratio for that particular crop. This helps the farmers to know whether they have spent excess and how to reduce the expenditure can be worked out. This also facilitated the farmers to understand the BCR between paddy and horticulture crops.

6.13 Awareness Creation and Sensitization on Marketing

The farmers were able to produce the horticulture crops but they faced difficulty in marketing their produce. Farmers are good producers and not talented persons to market their produce. Since they were no formal structure among the farmers, the middlemen used this opportunity and fixed low price for their produce. Since it is a perishable good the farmer also has to sell the produce at lower price whatever the middlemen fix.

Hence awareness and sensitization were arranged to farmers on marketing their produce. Continuous process of capacity building was carried out to the farmers on different strategies on marketing. This would motivated the farmers on the need and importance of marketing.

6.14 Exposure Visit on Marketing

An exposure visit arranged for the farmers that exposed them to practical knowledge. Exposure visit is an effective method to increase the capacity of the farmers. This helped in understanding the concept practically; the farmers get to know each other and helped in good rapport building among themselves.

6.15 Capacity Building

A continuous series of training on Drip Operation and Maintenance, Organic Farming, Crop Production Practices, Marketing their produce and formation of farmers group were organized and the farmers were motivated to attend the trainings. Capacity building enhances the awareness among the farmers and motivate them to earn higher profits and which build trust among themselves and implementing agency. Whenever need arises on a particular area the training was organized in that specified topic.

6.16 Formation of Farmers Group

It is a major hurdle for the farmers to meet and discuss various issues. Farmers group will help them to meet, discuss and make collective effort. Continuous field visits should be made by the staff members and village level meetings were organized to mobilize the farmers. Farmers from the same villages and who are doing farming were organized into a group with 15 to 20 members. Each farmer contributed Rs.1,000/- as their entry subscription in the farmers group. Two office bearers namely president and secretary shall be elected from the farmers group and bank account shall be opened in their farmers' group name. The two representatives will be the bank account operators and joint account shall be opened. The amount collected shall be recorded in the minutes notebook of the farmers group and then deposited in the bank account which was opened in the name of their group.

Farmers group is a platform to implement the activities that the implementing agency is planning to do. In the successive running of the farmers group, this may be converted to Farmers Producer Company in the long run by the convergence of all the farmers group formed in that area.

CONCLUSION

From the above, it was a Herculean task to convince the farmers to go for drip irrigation and was a great challenge to get their financial contribution. From the above experiences of the project we can come to a conclusion that continuous capacity building to

the farmers and the staff members helped to implement the project successfully. We should not try to impose any new projects into the villages, instead educate the farmers the need and importance of the project. This will motivate the farmers to voluntarily enroll themselves in the project. As a whole it was difficult to enroll one farmer in drip irrigation in the initial stages of the project, but now following the above said strategies we were able to enroll 194 farmers covering 300 ha in Tamil Nadu. After the completion of the project, hundreds of application to install drip irrigation systems from the farmers were received within a period of two months. This is the success of the outreach of the project and the credibility the implementing agency has earned from the farmers.

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